

ARCHEOLOGY

Project title: Geochemical Investigations of Obsidian Source Material

Principal investigator: Mr. Kenneth Cannon
Phone number: 402-437-5392, ext. 139
Email: ken_cannon@nps.gov
Address: Midwest Archeological Center
Federal Building, Rm 474
100 Centennial Mall North
Lincoln, NE 68508-3873

Additional investigator(s): Richard Hughes

Objective: To collect provenience and geochemical data on geologic sources of toolstone quality obsidian. This database will be used to compare geochemical data of artifacts for discerning aboriginal use of obsidian sources. This information will be useful in determining patterns of lithic procurement and land use in the Greater Yellowstone Ecosystem and beyond.

Findings: No fieldwork was conducted in YNP during 2000.

Project title: Archeological Research in Yellowstone National Park

Principal investigator: Dr. Leslie Davis
Phone number: 406-994-6614
Address: Museum of the Rockies
Montana State University
Bozeman, MT 59717-0272

Additional investigator(s): Brian Reeves

Objective: To carry out cultural resource compliance National Register testing, testing for preparation of data recovery plans, inventory in support of the trails rehabilitation program, salvage of eroding sites 48YE252 and 48YE409, and shoreline inventory on Yellowstone Lake.

Findings: Sites on the highway between Mammoth and Gardiner were evaluated for their significance. Some sites in this corridor remain to have their subsurface remains evaluated.

Trails work included inventory around Heart Lake, Jones Pass, and Warm Creek-Pebble Creek. Campground Site 24YE26 in the Black Canyon of the Yellowstone was tested and found to contain multiple stratified (n=6) components with intact features. The Pelican Lake (Late Archaic Period) occupations dominate the assemblages with earlier and later (possibly McKean) camps present. Of particular interest was the recovery of 3 large corner notched (hafted) knives manufactured from local (Hellroaring drainage)

chert/chalcedony.

Site 48YE252 was found to be multicomponent and being severely damaged by wave action on Yellowstone Lake. Judging from the artifact collection made on the beach, the site was occupied from Lake Paleoindian through Late Prehistoric times (~ 8000 BC to ~ AD 1500). Pelican Lake artifacts predominate. The hearth was radiocarbon dated to Pelican Lake culture (1970+/-60 BP).

Another eroding site, 48YE409, called Osprey Beach, was assigned to the Cody Complex and radiocarbon dated. Surface collecting and testing identified tools including 3 Cody Knives, a Scottsbluff point, and a sandstone shaft straightener. Examination of the geological profile by Drs. Ken Pierce (USGS) and Paul Doss (Yellowstone National Park geologist) suggests the Cody Complex people were camping on the Yellowstone Lake beach.

Data are accumulating for an obsidian sourcing project. This year, there is interesting information from the area south of Yellowstone Lake and the Yellowstone Lake shore. The southern portion of the park shows use by people using more Teton Pass and other southern obsidian sources, while the northern portion is dominated by Obsidian Cliff with Bear Gulch (Idaho) at about 7 percent. Specimens from Brown's Bench (southcentral Idaho on the Nevada border) and Crescent H (south of Wilson, Wyoming) were identified in Yellowstone archeological specimens for the first time this year.

Project title: FY00 Federal Highway Archeological Investigation in Yellowstone National Park

Principal investigator: Mr. David Eckles

Phone: 307-766-5301

Email: deckle@missc.state.wy.us

Address: OWSA

P.O. Box 3431

University Station

Laramie, WY 82071

Additional investigator(s): Paul H. Sanders

Objective: Archeological inventory along the north and south rim roads that border the Grand Canyon of the Yellowstone at Canyon; archeological test excavation of eight prehistoric sites along the Canyon to Lake Junction road; and additional site recording at historic sites 48YE23 (Canyon Incinerator) and 48YE155 (Canyon Transportation Complex).

Findings: The archeological inventory resulted in the recording of a historic cistern, two historic trash dumps, and remnants of the Canyon Lodge. Except for a small portion of a buried trash level dating to the Shaw and Powell occupation at the Canyon Lodge, all other properties are recommended as not eligible for nomination to the National Register of Historic Places.

The test excavations of the eight prehistoric sites found that they represent lithic scatters of varying sizes and date from the Early Archaic to the Late Prehistoric periods, primarily based on diagnostic artifacts. One hearth feature was uncovered at 48YE545 which dated at 1070 years BP. Except for the latter site, few clear buried cultural levels were encountered.

The site investigation of historic sites 48YE23 and 48YE155 resulted in the recording of a number of

features and a sparse amount of historic debris. Both sites had been razed, with few intact historic deposits. Both sites are recommended as not eligible due to the lack of integrity.

**Project title: Chemical Analysis of Obsidian Sources and Artifacts
from the Northwest and Great Plains, USA**

Principal investigator: Dr. Michael D. Glascock

Phone: 573-882-5270

Email: glascockm@missouri.edu

Address: Research Reactor Center

University of Missouri

Columbia, MO 65211

Additional investigator(s): Craig E. Skinner

Objective: The major objective of this research is to establish a geochemical database of obsidian sources in the northwestern USA, including sources in Yellowstone National Park and adjoining areas. Samples of obsidian from various source areas were collected and analyzed by three techniques (neutron activation analysis and x-ray fluorescence analysis and inductively coupled plasma-mass spectrometry) to establish the database. The geographic coordinates of each sample have been entered into the database along with the chemical analysis information. Artifacts from locations great distances from Yellowstone are now being analyzed similarly and compared to the source database. Patterns of obsidian exchange are being established.

Findings: In fall 2000 and continuing through 2001 we are utilizing a new and less destructive analytical technique to study obsidian source and artifact materials. This new method is laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). This new method is showing great potential for measuring trace elements that are sensitive to the differences between sources. The analytical sample is not destroyed or made radioactive by the analysis. More research on this technique will be necessary before it becomes routine, but preliminary work on sources from Yellowstone National Park and the surrounding region has been very positive. This new technique along with XRF and NAA will increase the options for archeologists interested in studying obsidian exchange.

Project title: A Comparison of Northern Elk to Red Deer

Principal investigator: Ms. Teresa Steele

Phone: 650-497-7623

Email: tsteele@stanford.edu

Address: Department of Anthropological Sciences

450 Serra Mall, Bldg. 360

Stanford University

Stanford, CA 94305-2117

Objective: This study has three objectives: 1) to compare two methods of assigning age to elk specimens, *cementum annuli* and tooth crown height; 2) to compare three methods of mortality profile construction using a sample of known accumulation (elk killed by wolves in 2000); and 3) to determine if mean tooth breadth for a sample can be used as a proxy for population body size. *Cementum annuli* data were collected by park biologists for their own projects, and I measured tooth crown height and breadth and metapodial breadth and depth on the same individuals. The ultimate objective of this research is to develop tools to help understand fauna found in archeology sites. Archeologists need to know how best to determine age on isolated ungulate teeth found in their assemblages. Mortality profiles found in archeology sites provide information about the mode of accumulation of the assemblage, but they are best understood in light of known comparative samples, such as this sample of elk killed by wolves.

Findings: I have completed data collection and am proceeding with analysis. Age classes based on tooth crown heights are similar to *cementum annuli* ages in younger animals, but crown height reached zero (and well below) before the animals were killed. This indicates that crown height is not a good measure of age in these older individuals. This work will not be written up until the NPS publishes their *cementum annuli* data. The three methods for constructing mortality profiles have been compared using the wolf kill sample, and all methods reconstruct an attritional profile using tooth crown heights. I presented a preliminary version of this work, "A comparison of different methods for analyzing the age structure of archeological samples of hypsodont ungulates," at the Society for American Archeology meetings in New Orleans, Louisiana on April 20, 2001) Currently, I am preparing this research for publication. I have not begun to analyze the tooth breadth data, but I will this autumn.